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10/506,611

07/06/2005

Jurgen Schulz-Harder

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EXAMINER

MEHTA, MEGHA S

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

05/07/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/506,611 | Applicant(s) SCHULZ-HARDER, JURGEN | |
| | Examiner MEGHA MEHTA | Art Unit 1793 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-9,11 and 13-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-9,11 and 13-23 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 6, 2009, has been entered.

Claim Objections

2. Claim 11 is objected to because of the following informalities: It is dependent on a cancelled claim. The Examiner is interpreting this as being dependent on claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: part c) when the resist is an edging resist instead of a photo resist. For purposes of examination, the Examiner is interpreting part c) to read, "removing the mask of photo resist or edging resist and applying...."

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3-7, 9, 11, 13-15, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,981,036 Schulz-Harder et al in view of US 5,756,377 Ohsawa.

Regarding claim 1, '036 Schulz-Harder teaches a process for producing a metal-ceramic substrate comprising a ceramic layer **2** and a structured metal layer **3** with conductive tracks and contact surfaces on at least one surface side of the ceramic layer, the process comprising the following steps: a) applying at least one copper foil to at least one surface side of the ceramic layer by high temperature bonding at a bonding process temperature higher than 650°C for forming at least one metal layer on the ceramic layer, b) structuring the metal layer on at least one surface side of the ceramic layer for forming the structured metal layer with conductive tracks and a contact surfaces (column 1, lines 9-16 and column 2, lines 55-56). Schulz-Harder does not teach the brazing resist. Ohsawa teaches a method of manufacturing a metal lead frame through structuring by c) applying the at least one coating of a resist to the structured metal layer after the structuring and d) removing some metal from the structured metal layer in an amount of 0.1-20 microns at least in surface areas bordering the resist coating (column 6, lines 25-30, 56-60 and 7-10, column 6, line 66 -- column 7, line 1 and figures 3A-3K). Ohsawa does not teach a brazing resist, but teaches a soldering resist instead. However, these are obvious variants of each other and one of ordinary skill in the art at the time of the invention would be able to select the appropriate resist for the application. It would have been obvious to one of ordinary skill in the art at the time of the invention to include the resist and structuring steps of Ohsawa in the method

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of Schulz-Harder because resist masks and structuring allows one to form the desired end product with the correct metal layers and formations.

Regarding claims 3 and 4, '036 Schulz-Harder teaches that the high-temperature bonding is a direct bonding process or an active soldering process, which is an obvious variant of an active brazing process (column 1, lines 11-13 and column 4, lines 56-58).

Regarding claims 5 and 6, Ohsawa teaches that the at least one coating of resist is applied before and after structuring (column 6, lines 25-30 and 56-60).

Regarding claim 7, '036 Schulz-Harder teaches that the metal foils are copper foils and they are provided on the ceramic substrate by means of the DCB process (column 1, lines 9-16).

Regarding claim 8, Ohsawa teaches that structuring of the at least one metal foil takes place by means of a masking-etching process and where in the at least one coating of brazing resist is applied immediately after this structuring (column 6, lines 25-30, 56-60).

Regarding claim 9, Ohsawa teaches that the structuring of the at least one metal foil takes place by means of a masking-etching process using an etching resist and wherein the at least one coating of resist is applied immediately before application of the etching resist (column 6, lines 25-30).

Regarding claim 11, Ohsawa teaches that removal takes place by etching, using hydrogen peroxide (column 6, lines 56-60).

Regarding claim 13, Ohsawa teaches that before the application of at least one resist coating cleaning of the metal surfaces, by removing a surface area of the metal coatings, takes place (column 6, lines 56-60).

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Regarding claim 14, Ohsawa teaches that cleaning takes place by chemical removal (column 6, lines 56-60).

Regarding claim 15, Ohsawa teaches that the chemical cleaning takes place using a hydrogen peroxide solution (column 6, lines 56-60).

Regarding claim 21, Ohsawa teaches that the at least one resist coating has a thickness of 0.5 to 100 microns (column 5, lines 4-5).

Regarding claim 23, '036 Schulz-Harder teaches a process for producing a metal-ceramic substrate comprising a ceramic layer **2** and a structured metal layer **3** with conductive tracks and contact surfaces on at least one surface side of the ceramic layer, the process comprising the following steps: a) applying at least one copper foil to at least one surface side of the ceramic layer by high temperature bonding at a bonding process temperature higher than 650°C for forming at least one metal layer on the ceramic layer, (column 1, lines 9-16 and column 2, lines 55-56). Schulz-Harder does not teach the brazing resist. Ohsawa teaches a method of manufacturing a metal lead frame through structuring by b) structuring the metal layer on at least one surface side of the ceramic layer by applying a mask of an edging resist and by subsequent edging away areas of the metal layer which are not covered by the mask of edging resist for forming the structured metal layer with conductive tracks and a contact surfaces c) removing the mask of edging resist and applying at least one coating of resist to the structured metal coating and d) removing some metal from the structured metal layer in an amount of 0.1-20 microns at least in surface areas bordering the resist coating (column 6, lines 25-30, 56-60 and 7-10, column 6, line 66 -- column 7, line 1 and figures 3A-3K). Ohsawa does not teach a brazing resist, but teaches a soldering resist instead. However, these are obvious variants of each other and one of

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ordinary skill in the art at the time of the invention would be able to select the appropriate resist for the application. It would have been obvious to one of ordinary skill in the art at the time of the invention to include the resist and structuring steps of Ohsawa in the method of Schulz-Harder because resist masks and structuring allows one to form the desired end product with the correct metal layers and formations.

7. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,981,036 Schulz-Harder et al and US 5,756,377 Ohsawa as applied to claim 1 above, and further in view of US 3,429,029 Langdon et al.

Regarding claim 16, '036 Schulz-Harder teaches a process of producing a metal-ceramic substrate and Ohsawa teaches the resist and structuring. Neither '036 Schulz-Harder nor Ohsawa teaches applying a metal coating in the removed areas. Langdon teaches making a structured substrate where a surface metal coating is applied to at least one surface area of the at least one metal coating, which area is produced by removal (column 4, lines 8-15). None of Schulz-Harder, Ohsawa or Langdon teaches applying the metal coating such that it adjoins the resist coating. However, where the metal is placed is based upon the desired final product. One of ordinary skill in the art would be capable of applying the metal coating wherever one wanted. Additionally, because the resist coating is being used as a mask, it only follows that the removed areas would be adjacent to the resist. It would have been obvious to include the coating of Langdon in the process of '036 and Ohsawa because structured substrates are created by applying layers in specific locations with the use of resist masks.

Regarding claims 17, 18 and 19, '036 Schulz-Harder teaches a process of producing a metal-ceramic substrate and Ohsawa teaches the resist and structuring. Neither '036 Schulz-

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Harder nor Ohsawa teaches applying a metal coating in the removed areas. Langdon teaches that the surface metal coating is applied such that the surface which has been formed by this surface metal coating is level with, projects over, or is lower than the surface level of at least one resist coating or of the untreated surface underneath the at least one resist coating (column 4, lines 47-48 and 66-67, column 5, lines 17-19 and figures 6, 7 and 8). It would have been obvious to include the coating of Langdon in the process of '036 and Ohsawa because structured substrates are created by applying layers in specific locations with the use of resist masks.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,981,036 Schulz-Harder et al and US 5,756,377 Ohsawa as applied to claim 1 above, and further in view of US 3,268,653 McNutt.

Regarding claim 20, '036 Schulz-Harder teaches the process of producing a metal-ceramic substrate. Ohsawa teaches an epoxide-based resist coating (column 5, lines 4-5) and structuring. Neither '036 nor Ohsawa teaches curing the resist thermally. McNutt teaches that it is known to cure an epoxy resist coating thermally (column 4, lines 3-6).

9. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,981,036 Schulz-Harder et al in view of US 5,756,377 Ohsawa as applied to claim 1 above, and further in view of US 5,676,855 Schulz-Harder.

Regarding claim 22, '036 Schulz-Harder teaches the process of producing a metal-ceramic substrate. Ohsawa teaches the resist and structuring. Neither '036 nor Ohsawa teaches forming an optically readable code. '855 Schulz-Harder teaches using the structuring to form coding (column 4, lines 57-60).

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10. Claims 1, 3-9, 11, 13-15 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,676,855 Schulz-Harder in view of US5,756,377 Ohsawa.

Regarding claim 1, '855 Schulz-Harder teaches a process for producing a metal-ceramic substrate comprising a ceramic layer **1** and a structured metal layer **2, 5, 6** with conductive tracks and contact surfaces on at least one surface side of the ceramic layer and a brazing resist applied to the structured copper layer, the process comprising the following steps: a) applying at least one metal foil to at least one surface side of the ceramic layer by high temperature bonding at a bonding process temperature higher than 650°C for forming at least one metal layer on the ceramic layer, b) structuring the metal layer on at least one surface side of the ceramic layer for forming the structured metal layer with conductive tracks and a contact surfaces (column 1, lines 9-18, column 3, lines 57-67 and column 4, lines 1-5). '855 Schulz-Harder does not teach applying the resist after structuring. Ohsawa teaches a method of manufacturing a metal lead frame through structuring by c) applying the at least one coating of a resist to the structured metal layer after the structuring and d) removing some metal from the structured metal layer in an amount of 0.1-20 microns at least in surface areas bordering the resist coating (column 6, lines 25-30, 56-60 and 7-10, column 6, line 66 -- column 7, line 1 and figures 3A-3K). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the structuring steps of Ohsawa in the method of Schulz-Harder because resist masks and structuring allows one to form the desired end product with the correct metal layers and formations.

Regarding claims 3 and 4, '855 Schulz-Harder teaches that the high-temperature bonding is a direct bonding process or an active brazing process (column 3, lines 57-67).

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Regarding claims 5 and 6, Ohsawa teaches that the at least one coating of resist is applied before and after structuring (column 6, lines 25-30 and 56-60).

Regarding claim 7, '855 Schulz-Harder teaches that the metal foils are copper foils and they are provided on the ceramic substrate by means of the DCB process (column 3, lines 57-67).

Regarding claim 8, Ohsawa teaches that structuring of the at least one metal foil takes place by means of a masking-etching process and where in the at least one coating of brazing resist is applied immediately after this structuring (column 6, lines 25-30, 56-60).

Regarding claim 9, Ohsawa teaches that the structuring of the at least one metal foil takes place by means of a masking-etching process using an etching resist and wherein the at least one coating of resist is applied immediately before application of the etching resist (column 6, lines 25-30).

Regarding claim 11, Ohsawa teaches that removal takes place by etching, using hydrogen peroxide (column 6, lines 56-60).

Regarding claim 13, Ohsawa teaches that before the application of at least one resist coating cleaning of the metal surfaces, by removing a surface area of the metal coatings, takes place (column 6, lines 56-60).

Regarding claim 14, Ohsawa teaches that cleaning takes place by chemical removal (column 6, lines 56-60).

Regarding claim 15, Ohsawa teaches that the chemical cleaning takes place using a hydrogen peroxide solution (column 6, lines 56-60).

Regarding claim 21, Ohsawa teaches that the at least one resist coating has a thickness of 0.5 to 100 microns (column 5, lines 4-5).

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Regarding claim 22, '855 Schulz-Harder teaches that the brazing resist coating is structured to form coding (column 4, lines 57-60).

Regarding claim 23, '855 Schulz-Harder teaches a process for producing a metal-ceramic substrate comprising a ceramic layer **1** and a structured metal layer **2, 5, 6** with conductive tracks and contact surfaces on at least one surface side of the ceramic layer and a brazing resist applied to the structured copper layer, the process comprising the following steps: a) applying at least one metal foil to at least one surface side of the ceramic layer by high temperature bonding at a bonding process temperature higher than 650°C for forming at least one metal layer on the ceramic layer, (column 1, lines 9-18, column 3, lines 57-67 and column 4, lines 1-5). Ohsawa teaches a method of manufacturing a metal lead frame through structuring by b) structuring the metal layer on at least one surface side of the ceramic layer by applying a mask of an edging resist and by subsequent edging away areas of the metal layer which are not covered by the mask of edging resist for forming the structured metal layer with conductive tracks and a contact surfaces c) removing the mask of edging resist and applying at least one coating of resist to the structured metal coating and d) removing some metal from the structured metal layer in an amount of 0.1-20 microns at least in surface areas bordering the resist coating (column 6, lines 25-30, 56-60 and 7-10, column 6, line 66 -- column 7, line 1 and figures 3A-3K). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the structuring steps of Ohsawa in the method of Schulz-Harder because resist masks and structuring allows one to form the desired end product with the correct metal layers and formations.

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11. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,676,855 Schulz-Harder and US 5,756,377 Ohsawa as applied to claim 1 above, and further in view of US 3,429,029 Langdon et al.

Regarding claim 16, '855 Schulz-Harder teaches a process of producing a metal-ceramic substrate and Ohsawa teaches the resist and structuring. Neither '855 Schulz-Harder nor Ohsawa teaches applying a metal coating in the removed areas. Langdon teaches making a structured substrate where a surface metal coating is applied to at least one surface area of the at least one metal coating, which area is produced by removal (column 4, lines 8-15). None of Schulz-Harder, Ohsawa or Langdon teaches applying the metal coating such that it adjoins the resist coating. However, where the metal is placed is based upon the desired final product. One of ordinary skill in the art would be capable of applying the metal coating wherever one wanted. Additionally, because the resist coating is being used as a mask, it only follows that the removed areas would be adjacent to the resist. It would have been obvious to include the coating of Langdon in the process of '855 and Ohsawa because structured substrates are created by applying layers in specific locations with the use of resist masks.

Regarding claims 17, 18 and 19, '855 Schulz-Harder teaches a process of producing a metal-ceramic substrate and Ohsawa teaches the resist and structuring. Neither '855 Schulz-Harder nor Ohsawa teaches applying a metal coating in the removed areas. Langdon teaches that the surface metal coating is applied such that the surface which has been formed by this surface metal coating is level with, projects over, or is lower than the surface level of at least one resist coating or of the untreated surface underneath the at least one resist coating (column 4, lines 47-48 and 66-67, column 5, lines 17-19 and figures 6, 7 and 8). It would have been obvious to

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include the coating of Langdon in the process of '855 and Ohsawa because structured substrates are created by applying layers in specific locations with the use of resist masks.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,676,855 Schulz-Harder and US 5,756,377 Ohsawa as applied to claim 1 above, and further in view of US 3,268,653 McNutt.

Regarding claim 20, '855 Schulz-Harder teaches the process of producing a metal-ceramic substrate. Ohsawa teaches an epoxide-based resist coating (column 5, lines 4-5) and structuring. Neither '036 nor Ohsawa teaches curing the resist thermally. McNutt teaches that it is known to cure an epoxy resist coating thermally (column 4, lines 3-6).

Response to Arguments

13. Applicant's arguments filed April 6, 2009, have been fully considered but they are not persuasive. Applicant argues that Ohsawa would not be appropriate for a DCB process. However, the Examiner is modifying only for the solder resist and structuring steps, not the product. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MEGHA MEHTA whose telephone number is (571)270-3598. The examiner can normally be reached on Monday to Friday 7:30 am to 5:00 pm EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Megha Mehta/
Examiner, Art Unit 1793

/Kevin P. Kerns/
Primary Examiner, Art Unit 1793